Space Weather Forecast

Issued on Saturday, 27 August 2022 at 12:29 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares Likely. Chance of Strong flares. G1 Minor Storm possible with coronal mass ejection glance late day 2 or early day 3 (28th or 29th). Ongoing S1 Storm.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: There were numerous Moderate class flares observed in the last 24 hours. These initially came from a moderately sized sunspot region in the southeast disc, which has subsequently eased, but perhaps also had some contribution from another sunspot in the southwest. This sunspot is larger, more complex, and has continued to grow in the last 24 hours, producing further Moderate flares. One of these also produced a moderately fast CME, which has been assessed as giving a glancing impact late on the 28th or early 29th, although confidence is low due to the source location and limited imagery which made the assessment difficult.

Solar Wind / Geomagnetic Activity: The solar wind likely showed an ongoing arrival of faster solar winds from a coronal hole. The wind speed was mainly at background, however, although the magnetic field increased from weak levels to become moderate 8-14nT from around 27/0800 UTC. The north-south component of the magnetic field was initially unremarkable, but became predominately negative (southward) from 27/0900 UTC. Geomagnetic activity was Quiet, but increased to Active by 27/0900-1200 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) increased as a result of the Moderate-flaring of the large sunspot in the southwest. This led to an S1 Radiation storm occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely with a chance of a Strong flare. This risk will decrease later in the period as the main sunspot in the southwest rotates off the disc.

Solar Wind / Geomagnetic Activity: There is one CME which has the potential to give a glancing arrival late on the 28th or early 29th. Current fast wind enhancement is expected to give Active with a chance of G1 Minor Storm geomagnetic activity on day 1 (27th). Further enhancement day 2 or day 3 (28th or 29th) is likely from another coronal hole sourced fast wind. This could be coupled with any CME arrival, giving the potential of Active to G1/Minor Storms, with a slight chance of G2/Moderate storms. Thereafter conditions are expected to ease towards background with increasingly Quiet geomagnetic activity.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to fall back below the S1 level on day 1 (27th), however there is a chance of this increasing again, above this level, with any notable flares from the large sunspot.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	40	60	1
Strong	G3	No	1	5	5	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	70	70	60	30
Very Active	R3 to R5 X	No	25	25	20	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	100	30	20	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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